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LXXV.—*New Species of Indian Aculeate Hymenoptera.*
By Major C. G. NURSE, Indian Army.

[Concluded from p. 526.]

Crabro gulmargensis, sp. n.

♀. Head as wide as thorax; clypeus short, carinate in the centre, its anterior margin subporrect; front above the base of antennæ very concave, smooth and shining, the carina of the clypeus produced along the front; the smooth portion of the front reaches about halfway from the base of antennæ to ocelli; the remaining portion, as far as the ocelli, very finely longitudinally striate, the vertex behind the ocelli shining, with sparse and very fine punctures; pronotum very finely longitudinally striate, its apex notched in the centre; mesonotum finely rugose anteriorly, finely longitudinally striate posteriorly; scutellum smooth and shining, with a few scattered punctures; postscutellum finely punctured; median segment, which is very much below the level of mesonotum, coarsely longitudinally striate in the centre, finely obliquely striate at the sides; abdomen not petiolate, but gradually widening to the third segment, smooth and shining, pygidial area finely punctured. Black; the scape of the antennæ, except a small spot at its base above, two apical spots, not quite meeting in the centre, on the pronotum, a spot on the

scutellum, subapical bands on segments 1-4, those on segments 2 and 3 interrupted medially, a somewhat wider apical band on the fifth segment, the apex of the anterior femora, and the tibiæ and tarsi of all the legs, yellow, the latter sometimes yellowish red; the clypeus, and sometimes the scape, is covered with long silvery pubescence, which is stiff on the former and hides its sculpturing; the remainder of the head and thorax, and the femora of the legs, are sparsely covered with rather long pubescence, which is black above and greyish below; fifth abdominal segment and pygidium with short stiff hairs, which in some lights appear golden in tint. Wings fusco-hyaline, with a flavous tinge; nervures testaceous, tegulæ black.

♂. Similar, but the scape and the first seven or eight joints of the antennæ are much dilated, and the formation of the anterior legs is very remarkable; the tibiæ are irregularly widened, and the first joint of the tarsi is flattened, forming a large oval excrescence, shaped like an inverted saucer, smooth and shining.

Long. 8-14 millim.

Hab. Gulmarg, Kashmir, 8000-9000 feet; fairly common.

This species would come in Bingham's key in section B, under a new sub-section. The size in both sexes varies considerably, and the markings are frequently orange-red, many of them being in some specimens quite obsolete.

Eumenes placens, sp. n.

♀. Clypeus with sparse shallow punctures; remainder of head, thorax and first abdominal segment closely and finely punctured, second abdominal segment with still finer punctures; clypeus broad, very convex, reaching well below the eyes, its anterior margin deeply emarginate; the carina between bases of antennæ grooved posteriorly; a median longitudinal impressed line at base of mesonotum, and a median longitudinal carina on scutellum at base, ending in a hollow at apex; median segment convex, nearly vertical, with a groove down the middle, the groove not much broadened below; petiole of abdomen about the same length as the thorax, very narrow at base, increasing in width just before the centre, at apex more than twice as wide as at base, having lateral tubercles about the middle, and an obscure median longitudinal groove along the wider portion. Head and thorax black; abdomen dark red; the mandibles, except their extreme base, clypeus, except a central spot, scape below, antennal carina, a narrow line from the clypeus along the inner orbits reaching

their emargination, a narrow line along the outer orbits reaching the vertex, the greater part of the pronotum, two lateral spots narrowed posteriorly on the mesonotum, a large mark on the mesopleuræ, a spot behind the tegulæ, the scutellum, the posterior half of the postscutellum, large sublateral maculæ on the median segment, two sublateral spots about the middle and the apical margin narrowly of the first abdominal segment, a narrow subbasal band, medially interrupted, and a somewhat wider apical band, widest above but medially interrupted, on the second segment, the apices of the following segments (which are, as usual, withdrawn telescopically in the type specimen), and the greater part of the anterior legs below, yellow; the yellow markings on the abdomen are not very clearly defined; antennæ and legs light red. Wings hyaline, the costal margin of fore wing with a flavous tinge; nervures black, except at the base of the wings, where they are testaceous; tegulæ yellow.

Long. (to end of second abdominal segment) 12 millim.

Hab. Murree-Kashmir road, about 4000 feet; a single specimen.

This species would come into Bingham's key in group B on p. 335.

Eumenes viatrix, sp. n.

♂. Clypeus and front smooth, vertex of head and thorax closely but shallowly punctured, first abdominal segment somewhat sparsely punctured above; clypeus long, slightly convex, its anterior margin transverse and reaching below the lower portion of eyes; the front between the bases of antennæ slightly raised; a well-marked longitudinal impressed line terminating at the anterior ocellus; a similar line on the mesonotum, not reaching its apex; scutellum slightly notched; median segment with a central groove, widening at apex into a deep hollow; first abdominal segment with small lateral tubercles. Head and thorax black; abdomen red; the mandibles, clypeus, and front as far as the base of antennæ, the emarginations of the eyes, a narrow line on the outer orbits, the pronotum except its posterior lateral margin, two short longitudinal lines on the mesonotum, a large mark on the metapleuræ, two large spots on the scutellum, a median transverse line on the postscutellum, the sides of the median segment, two obscure sublateral spots on the petiole and a band at its apex, somewhat obscure narrow apical bands on segments 2 to 6, the greater portion of the anterior legs, the coxæ and femora below, and the tibiæ above of the intermediate and posterior legs, yellow; the remainder of the

intermediate and posterior legs red or reddish. Wings subhyaline, their costal margins with a flavous tinge; tegulae yellow, nervures black.

Long. (to end of second abdominal segment) 15 millim.

Hab. Murree-Kashmir road, about 4000 feet; a single specimen.

This species would come into Bingham's key in group "C. V."

Odynerus praecclusus, sp. n.

♀. Head and thorax somewhat closely punctured; abdomen smooth; clypeus produced anteriorly, its apex transverse, antennal carina short; thorax wider anteriorly than posteriorly, median segment gradually sloped, its apex rounded; first abdominal segment nearly twice as broad as long. Black; two lateral marks on the clypeus anteriorly, its posterior margin, scape of antennae in front, a small triangular spot at the top of the antennal carina, continued posteriorly in a line which stops just short of the anterior ocellus, the emargination of the eyes, a line on the outer orbits, a spot on each side of the vertex, a line on the pronotum anteriorly, sublateral spots on the median segment, and narrow apical bands on the first and second abdominal segments, yellow or greenish yellow; the band on the second abdominal segment is bisinuate above and continued below, where it forms two large maculae, not quite touching one another in the centre; mandibles and legs red, the latter with yellow markings. Wings hyaline, nervures black; tegulae yellow anteriorly and posteriorly, in the centre black.

Long. 6-7 millim.

Hab. Mount Abu; not common.

This species would come into Bingham's key after *O. intendens*.

Odynerus sequestratus, sp. n.

♀. Head and thorax finely and closely punctured; abdomen smooth; clypeus with its anterior margin produced, very narrow, and incised at apex; postscutellum rounded posteriorly, median segment depressed, vertical, its sides rounded, its centre very concave; first abdominal segment cup-shaped, about $1\frac{1}{2}$ times as broad as long, slightly narrower at apex than second segment. Black; the mandibles except their tips, the clypeus except a spot in the centre, a coronet-shaped mark above it, the scape below, the sinus of the eyes, a line along both outer and inner orbits, not meeting at the

vertex, a broad band on the pronotum, an oval medial apical spot on the mesonotum, two lateral spots on the scutellum, the postscutellum, large oval lateral spots on the median segment, subbasal lateral free spots on the second abdominal segment, an apical band (broadest in the centre) on first, and bisinuate apical bands (broadest in the centre) on the remaining abdominal segments, the coxæ of all the legs, femora of anterior and intermediate legs, tibiæ and tarsi of the anterior and tibiæ above of the intermediate and posterior legs, yellow; base of first abdominal segment and sometimes the centre of the median segment red; legs, where not yellow, red or reddish testaceous. Wings hyaline, nervures black, tegulæ yellow.

♂. Similar, slightly smaller, the clypeus wholly yellow; the yellow mark on the inner orbit only in the sinus of the eyes.

Long., ♀ 8, ♂ 6.5 millim.

Hab. Deesa; not common.

This species is closely allied to *O. diffinis*, from which it differs in having the abdomen smooth and the wings hyaline, besides in some of the markings.

Odynerus hostis, sp. n.

♀. Very stoutly built; head, thorax, and abdomen closely but shallowly punctured, the punctures on the vertex and mesonotum closest, but those on the apex of the second abdominal segment deepest; clypeus subovate, very convex, its anterior margin incised; bases of antennæ situated in a deep hollow, a median longitudinal impressed line from between them to the anterior ocellus; a similar line on basal half of mesonotum; median segment very short, concave in the centre, the sides rounded; first abdominal segment twice as broad as long. Dark red or reddish black; the clypeus, a coronet-shaped mark above it, the scape in front, a line along both the inner and outer orbits, not quite meeting at the vertex, the pronotum anteriorly, a large mark on the episternum, a spot behind the tegulæ, the lateral margins of the scutellum, the postscutellum, the apices of abdominal segments 1-5, and large lateral spots, joining on to and forming part of the apical bands, on segments 1 and 2, yellow; the region of the ocelli, a median spot on the first abdominal segment, and the base and centre of the second and following segments black or blackish; legs light red or yellowish red. Wings subhyaline, the margins, especially the costal margin, slightly infuscated; tegulæ red or yellowish red; nervures black, except those at the base of the wings, which are testaceous.

♂. Similar, but the clypeus has a deep semicircular excavation anteriorly, the apices of the antennæ are yellowish, and the ground-colour of the head and thorax is black; the tibiæ and tarsi are yellow, and in some specimens there are sublateral yellow spots on the median segment.

Long. (to end of second abdominal segment) 9-10 millim.

Hab. Mount Abu; very common.

Next to *O. guttatus*. The male bears a strong superficial resemblance to a large edition of *O. ovalis*; but, apart from size, the present species may be distinguished from *O. ovalis* by its broader clypeus, with a much deeper emargination at apex, and by the scutellum, which is only yellow at the lateral angles.

Odynerus segregatus, sp. n.

♀. Rather stoutly built; vertex of head, thorax, and second and following abdominal segments somewhat coarsely punctured, clypeus and front finely and shallowly, first abdominal segment sparsely and shallowly punctured, sides of median segment rugose; clypeus subpyriform, its apex incised, the portion of the front between the bases of antennæ raised, with an impressed median line posteriorly; median segment vertical, concave, its sides truncate or produced backwards; first abdominal segment nearly twice as broad as long, its apex as wide as second segment. Black; the mandibles at base, clypeus and front, except a spot behind the base of each antenna, and a line along the outer orbits, a broad band on the pronotum, a spot on the episternum, the lateral angles of the scutellum, the postscutellum, and apical bands on first, second, and third abdominal segments, yellow; the band on the first segment is incised in the middle and slightly widened at the sides, that on the second segment is bisinuate, widened at the sides, and continued below, where it covers nearly the whole of the segment, that on the third segment is bisinuate above and below; base of first abdominal segment red; legs red, variegated with yellow. Wings hyaline, nervures black, tegulæ yellow.

Long. (to end of second abdominal segment) 9 millim.

Hab. Deesa; a single specimen.

This species would come into Bingham's key next to *O. fistulosus*.

Prosoxis kashmirensis, sp. n.

♀. Clypeus and front sparsely, vertex and thorax minutely, abdomen shining, very minutely punctured; enclosed space

at base of median segment very finely rugose, with a few longitudinal striæ at base; clypeus reaching very little below lower margin of eyes, front between bases of antennæ subtuberculate; three longitudinal lines on basal portion of mesonotum; sides of median segment rounded, an impressed median line on the apical portion of the segment. Black; a wide subtriangular mark along the inner margins of the eyes as high as the base of antennæ, a medially interrupted line on the pronotum, a spot below the base of the wings, and all the tibiæ at base, yellow; thorax posteriorly, tibiæ and tarsi with greyish pubescence. Wings hyaline; nervures and tegulæ testaceous, the latter anteriorly yellow.

♂. Similar; the whole of the clypeus and front, as high as the base of antennæ, and the base of the posterior tarsi yellow.

Long. 5 millim.

Hab. Kashmir; three specimens obtained between 6000 and 8000 feet.

This species would come into Bingham's key after *P. mustela*.

Prosopis gujaratica, sp. n.

♀. Stoutly built; clypeus and front finely aciculate, vertex and thorax with minute punctures, enclosed space at base of median segment finely reticulate at base, coarsely at apex; abdomen shining, finely aciculate; clypeus reaching only slightly below the lower margin of eyes, its anterior margin rounded; the front between the bases of antennæ almost flat, with a median longitudinal line; two short, parallel, sublateral lines on mesonotum. Black, the abdomen with a castaneous tinge; a broad line on the inner orbits, not quite reaching the vertex, a line on the pronotum, the tubercles, tegulæ, apex of femora, and the whole of the tibiæ and tarsi of all the legs, bright yellow; flagellum of antennæ dark testaceous; abdomen posteriorly, tibiæ, and tarsi with a little greyish pubescence. Wings hyaline and iridescent; nervures testaceous, those near the stigma darkest.

Long. 4.5 millim.

Hab. Deesa; fairly common.

Nearest to *P. mustela*.

Prosopis repentens, sp. n.

♀. Head and thorax with very minute punctures; abdomen impunctate, slightly shining; clypeus reaching a little below the lower margin of eyes, its apex slightly excavate;

three parallel impressed lines on mesonotum—one median, basal, two sublateral; median segment rounded posteriorly, its base smooth or with very minute punctures. In colouring and as regards the wings this does not differ from the preceding species. It has, however, a little snow-white pubescence on the sides of the median segment, and a line of similar pubescence on each side at the apex of the first abdominal segment, in the latter respect being similar to many European species of the same genus.

Long. 4–4.5 millim.

Hab. Deesa; fairly common.

Nearest to *P. gujaratica* above, but the different sculpturing of the median segment renders them readily separable.

Prosopis montana, sp. n.

♀. Stoutly built; head and thorax closely and finely punctured, median segment finely rugose, its base almost striate; abdomen impunctate or nearly so, the first two segments shining; clypeus reaching not much below the lower margin of eyes, its anterior margin rounded; an impressed line from antennal carina to anterior ocellus; three longitudinal carinae on mesonotum—one median basal, the others sublateral; median segment rounded posteriorly, with a median longitudinal carina at apex. Black; a spot in the centre of clypeus, a lunate spot above it, the latter joining on to marks along the inner orbits, which are broadest medially, and reach as far as the base of antennae, an interrupted line on the pronotum, the tubercles, tegulae anteriorly, and all the tibiae at base, yellow; flagellum of antennae rufo-testaceous, tarsi inclining to testaceous at apex; median segment, legs, and apex of abdomen with short greyish pubescence; a narrow line of silvery pubescence on each side of first abdominal segment at apex. Wings hyaline, nervures black, tegulae shining testaceous.

Long. 5 millim.

Hab. Mount Abu; not very common.

Near to *P. gujaratica* and *repentens* above, but more stoutly built and different in colouring.

Prosopis vetusta, sp. n.

♀. Head and thorax with very fine and shallow punctures, median segment at base somewhat finely rugose; abdomen nearly impunctate, shining; clypeus transverse anteriorly, not reaching below the lower margin of eyes, the front between the bases of antennae raised, almost tuberculate, with a

median longitudinal line; enclosed space at base of median segment semicircular, enclosed by carinæ, the apical portion of the segment with a median longitudinal carina, on either side of which are transverse striations. Black; the anterior portion of the clypeus, the sides of the front broadly to rather above the base of antennæ, a medially interrupted line on the pronotum, a spot below the base of the wings, the tegulæ anteriorly, the anterior tibiæ above, the base of the intermediate tibiæ, and the basal half of the posterior tibiæ bright yellow; calcaria of posterior tibiæ pale; apical portion of abdomen and the tibiæ and tarsi with stiff greyish pubescence. Wings hyaline; nervures testaceous at base of wings, blackish at apex; tegulæ posteriorly testaceous.

Long. 5.5 millim.

Hab. Kashmir; a single specimen obtained between 5000 and 6000 feet.

Nearest to *P. strenua*.

Prosopis secreta, sp. n.

♂. Head and thorax finely and somewhat closely punctured, median segment coarsely rugose; abdomen shining, with very fine and shallow punctures; clypeus rounded anteriorly, reaching well below lower margin of eyes, the portion of the front between the bases of antennæ very slightly raised; a somewhat obscure median longitudinal line on the mesonotum and scutellum, median segment with a median carina posteriorly; apical margin of first abdominal segment slightly depressed. Black; the clypeus and front as high as the base of antennæ, a spot on the tegulæ anteriorly, the anterior tibiæ above, a spot at the base of intermediate tibiæ, the basal two fifths of posterior tibiæ, and the basal joint or two joints of intermediate and posterior tarsi, pale yellow; flagellum of antennæ rufescent; abdomen posteriorly and legs with sparse greyish pubescence. Wings hyaline, nervures and tegulæ (except the yellow spot on the latter) black or blackish.

Long. 5 millim.

Hab. Kashmir; a single specimen obtained between 5000 and 6000 feet.

This species would come after *P. scutula*.

Prosopis advocata, sp. n.

♀. Head and thorax finely and shallowly punctured, median segment coarsely rugose; abdomen shining, impunctate; apex of clypeus reaching slightly below lower margin

of eyes, the front between the bases of antennæ raised, with a slight median groove; a median longitudinal line on mesonotum. Black; a triangular mark along the inner orbits, reaching as high as the base of antennæ, a spot on each lateral angle of the pronotum, the tegulæ anteriorly, a spot below the base of wings, a spot at the base of the anterior and intermediate tibiæ, and about two fifths of the posterior tibiæ at base, pale yellow or yellowish white; flagellum of antennæ sometimes rufescent; the abdomen (especially towards its apex) and the tibiæ and tarsi are covered with short, stiff, greyish hairs. Wings hyaline, nervures black.

Long. 5.5 millim.

Hab. Kashmir, 5000–6000 feet; two specimens.

This species comes next to *P. Feai*, but differs from it in the clypeus being black, not yellow. The abdomen is also impunctate, whereas in *P. Feai* it is shallowly punctured.

Sphcodes sutor, sp. n.

♀. Head closely and finely punctured, the punctures being slightly wider apart on the clypeus and behind the ocelli than on the vertex and front; mesonotum and scutellum sparsely punctured, postscutellum finely longitudinally rugose, median segment coarsely longitudinally rugose; abdomen impunctate or nearly so; clypeus transverse anteriorly, with a median vertical groove on the apical half and a transverse groove across the centre; thorax truncate anteriorly, the "shoulders" angled, almost dentate; median segment with a well-marked longitudinal carina at apex; first abdominal segment not or scarcely constricted; the whole insect (except the postscutellum, which is opaque) conspicuously shining. Head and thorax black; abdomen red, apical segment blackish; legs black (except the last four or five joints of the tarsi, which are red); a little sparse greyish pubescence, thickest on the front; tibiæ and tarsi with thicker pubescence, which is dark or blackish on the outside, paler inside. Wings fuscous, nervures and tegulæ black.

Long. 10–12 millim.

Hab. Kashmir, 5000–6000 feet; very common.

Nearest to *S. apicatus*, from which it can be distinguished by the thorax being sparsely and not closely punctured.

Sphcodes hanuman, sp. n.

♀. Head finely and closely, mesonotum and scutellum sparsely punctured; base of median segment longitudinally rugose, its sides very finely striate, the striations curved, apex

of the segment finely rugose; abdomen with very minute and close punctures, the apices of the segments more or less smooth; clypeus transverse anteriorly, its sculpturing and that of the front hidden by the pubescence; pronotum truncate anteriorly, its "shoulders" sharply angled; segments of the abdomen not constricted. Black; the abdomen red; mesonotum and scutellum shining; pubescence on the front, sides of the thorax, postscutellum, legs, and apical abdominal segments greyish. Wings hyaline, nervures black, tegulae bronzy testaceous.

Long. 8-9 millim.

Hab. Kashmir, 5000-6000 feet; apparently not common.

Allied to *S. montanus*, but the thorax is sparsely and not coarsely punctured and the abdomen is entirely red.

Sphecodes abuensis, sp. n.

♀. Head and thorax closely and finely, abdomen very minutely and closely punctured; clypeus transverse anteriorly, its apex reaching well below the lower margin of eyes; a median impressed line on the basal half of the mesonotum, enclosed space at base of median segment, which is lunate in shape, somewhat finely rugose, the segment truncate posteriorly; abdominal segments not or scarcely constricted. Black; the abdomen (except the apical one or two segments) and the apical two or three joints of the tarsi red; head and thorax more or less covered with snow-white pubescence, thickest on the clypeus and front, where it hides the sculpturing, a little greyish pubescence on apical abdominal segments; legs covered with somewhat sparse greyish pubescence, which becomes almost fulvous on the inside of the posterior tarsi in some specimens. Wings subhyaline, nervures black, tegulae testaceous.

♂. Similar, the basal abdominal segment or the greater part of it black; the pubescence on the legs shorter, the margins of the abdominal segments slightly constricted in most specimens; the wings clear hyaline, the stigma and most of the nervures testaceous.

Long. 7-11 millim.

Hab. Mt. Abu; very common.

Nearest to *S. montanus*, from which it differs in the head and thorax being finely and not coarsely punctured and in several other respects.

Sphecodes tantalus, sp. n.

♀. Head very finely and closely, mesonotum and scutellum equally finely but more sparsely punctured, median segment

with the enclosed space at base almost semicircular, well defined by a marginal carina, and somewhat coarsely longitudinally rugose; sides and apex of median segment finely obliquely striate; abdomen impunctate; clypeus transverse anteriorly, with a median longitudinal depression; the portion of the front between the bases of antennæ raised, a narrow impressed line from it to the anterior ocellus; "shoulders" of pronotum very slightly angled; median segment rounded posteriorly; abdominal segments not constricted. Black; the abdomen red; mesonotum, scutellum, and abdomen shining; clypeus and front, sides of thorax, legs, and apical segments of abdomen sparsely covered with greyish pubescence. Wings hyaline, nervures and tegulæ blackish.

Long. 7-8 millim.

Hab. Kashmir, 5000-6000 feet; apparently not common.

Nearest to *S. montanus*, but it is a smaller species, the abdomen is not so dark a red, the punctures on head and thorax are finer, the "shoulders" of the pronotum are much smaller, and the pubescence is more sparse.

Sphecodes perplexus, sp. n.

♀. Head finely and closely, mesonotum and scutellum finely and sparsely punctured; median segment with a well-defined, circular, enclosed space at base, which is somewhat coarsely longitudinally rugose; abdomen with punctures only visible with a microscope; clypeus transverse anteriorly, the portion of the front between the bases of antennæ raised, with a narrow carina towards but not quite reaching the anterior ocellus; "shoulders" of pronotum rounded, abdominal segments not constricted. Black; the mandibles (except their tips), tibiæ, tarsi, and abdomen red; antennæ (especially the apical joints) sometimes rufous; pubescence on head, sides of thorax, legs, and apical abdominal segment sparse and whitish. Wings hyaline, nervures blackish, tegulæ red.

Long. 5-6.5 millim.

Hab. Kashmir, 5000-6000 feet; common.

This species would come nearest to *S. rubripes*, from which it can be distinguished by the thorax being sparsely punctured and the femora black.

Sphecodes desertus, sp. n.

♀. Vertex of head closely and finely, mesonotum and scutellum sparsely and coarsely, abdomen very finely and closely punctured; clypeus transverse anteriorly; median

segment truncate posteriorly, the enclosed space at base (which is not very clearly defined) somewhat coarsely longitudinally rugose; apical margin of first abdominal segment very slightly constricted. Black; the mandibles (except their tips), the antennæ, and the legs (except the apical half of posterior tibiæ) red; mesonotum, scutellum, median segment, and abdomen shining; head, sides of the thorax, and postscutellum covered with thick snow-white pubescence, which hides the sculpturing of the clypeus and front; legs with white, apical abdominal segments with greyish pubescence. Wings clear hyaline, nervures and stigmata testaceous, tegulæ very light testaceous.

♂. Similar; the antennæ darker red, the margins of the abdominal segments more or less constricted and the apical abdominal segment or segments blackish.

Long. 7-8 millim.

Hab. Deesa, Mt. Abu; not common.

Having the legs red, this species would come next to *S. rubripes*, from which it would appear to be very distinct.

As regards habits, the species of *Sphecodes* which occur in Kashmir would seem to follow those of their European allies. When I was in Kashmir in May and June I obtained some fifty or sixty specimens of this genus, but there was not a single male among them. I therefore presume that the females hibernate in an impregnated condition and the males do not emerge until the latter part of the summer, as with the British species of the same genus. The females of the species which occur at Deesa and Mount Abu, where there is practically no winter, do not seem to hibernate, so far as I have been able to observe.

Halictus magnificus, sp. n.

♀. Clypeus and vertex finely but not very closely, the front below the ocelli very finely and closely, mesonotum and scutellum sparsely punctured, all the punctures shallow; abdomen impunctate; clypeus very convex and conspicuous, its apex transverse; mesonotum with a median impressed line, median segment short, rounded posteriorly, the enclosed space at base well defined by furrows, and with a median longitudinal indentation or furrow; this space is very finely striate, the striations being longitudinal at base in the centre, transverse at apex, and oblique at the sides, where they are continued over the furrow on to the lateral portion of the segment. Black, the apical two or three joints of the tarsi ferruginous; pubescence on the apex of the clypeus, tibiæ,

and tarsi fulvous or fulvescent, elsewhere greyish; it is sparse on the clypeus and front, and forms apical bands on abdominal segments 1-4; tibial calcaria testaceous, the inner calcar on the posterior legs strongly serrate on the inside. Wings hyaline, with a flavous tinge, slightly darker at apex; nervures and stigma testaceous, tegulæ dark brown.

Long. 15-17 millim.

Hab. Kashmir, 5000-6000 feet; frequents thistles.

This does not fit well into any of the sections of Bingham's key. It is, however, much the largest species that has hitherto been recorded from India.

Halictus resurgens, sp. n.

♀. Clypeus finely but not very closely, remainder of head and thorax minutely and very closely punctured, abdomen finely aciculate; clypeus much produced, transverse anteriorly; head as wide as thorax; mesonotum with a median longitudinal impressed line; enclosed space at base of median segment large, concave, and minutely rugose, appearing, when viewed in some directions, obliquely striate. Black; the apical two or three joints of the tarsi testaceous, also the calcaria; inner calcar of posterior tibiæ serrate on the inside; pubescence grey, forming apical bands on abdominal segments 1-4 and a slight basal band in the second segment; on the tibiæ, tarsi, and round the anal rima it is fulvescent. Wings hyaline, nervures and stigma testaceous, tegulæ dark testaceous.

Long. 11-12 millim.

Hab. Kashmir, 5000-6000 feet; common.

Nearest the previous species, but smaller; the different puncturing of the mesonotum would serve to distinguish them at once.

Andrena patella, sp. n.

♀. Clypeus closely and finely, remainder of head more minutely, abdomen minutely but not very distinctly punctured, the sculpturing of the thorax hidden by the pubescence; clypeus transverse anteriorly, with a median longitudinal carina, front with a carina from anterior ocellus which does not reach the carina on the clypeus. Black; intermediate and posterior tarsi rufo-testaceous, tibial calcaria pale; pubescence dense, on head, thorax, legs, and first two abdominal segments pale fulvous, palest on the latter; on the remainder of abdomen it is black, on the fifth segment mixed

with fulvous and griseous hairs. Wings flavo-hyaline, slightly paler at apex; nervures and tegulæ dark testaceous to black.

Long. 13-14 millim.

Hab. Kashmir, 6000-7000 feet; two specimens.

I am unable to place this species in Bingham's key, which is most unsuitable for working out this genus, owing to the pubescence seldom allowing the sculpturing of the base of the median segment to be properly seen. It is, however, easily distinguished by its flavo-hyaline wings.

Nomada decorata (Smith).

The description does not give the sculpturing, which is as follows:—

♀. Head and thorax finely, abdomen much more minutely punctured; the basal portion of enclosed space at base of median segment finely longitudinally striate, apical portion punctured.

The male has not, I believe, been previously described.

♂. Similar to the female, except that there is no large yellow macula on median segment, the basal portions of abdominal segments are black instead of ferruginous (in some specimens the apical portions are also black), and the legs, though they vary somewhat in different specimens, are generally darker.

The pubescence in both sexes is whitish and sparse, except on the clypeus, front, and sides of the median segment, where it is somewhat dense.

Nomada beata, sp. n.

♀. Head and thorax finely and rugosely punctured, with a granular appearance; abdomen smooth; clypeus subporrect, its apex transverse; a short carina between bases of antennæ; pronotum very short, depressed in the centre; scutellum with its lateral margins much raised, almost tuberculate; median segment with a large triangular area at base smooth and a median longitudinal impressed line. Red; the junctions of the segments of the thorax and the base of the first abdominal segment black; large irregular sublateral spots on second and third and a median band on third and fourth abdominal segments yellow; all the yellow markings somewhat ill-defined and obscure; clypeus, legs, and apical abdominal segment with short, sparse, golden pubescence.

Wings flavo-hyaline, a lighter patch beyond third cubital cell; nervures testaceous, tegulæ red and finely punctured, stigma pale testaceous.

Long. 11-13 millim.

Hab. Kashmir, 5000-6000 feet.

Nomada radiata, sp. n.

♀. Differs from *N. beata* only as follows:—Smaller, the enclosed space at base of median segment finely rugosely punctured; the spots on the abdomen are smaller; wings fusco-hyaline, with no flavous tinge; nervures black or blackish, not pale testaceous.

♂. Similar; wings paler, almost hyaline; abdomen lighter red; head and thorax with greyish pubescence, which is longest and thickest on the clypeus and front; scape and first three joints of flagellum black above.

Long., ♀ 6-10, ♂ 7-8 millim.

Hab. Kashmir, 5000-6000 feet; common.

This species, especially the female, varies a great deal in size. A variety has the yellow markings entirely obsolete.

Nomada arida, sp. n.

♀. In sculpturing scarcely differs from *N. beata*. Colour as follows:—Black; the mandibles, labrum, apex of clypeus, antennæ, and legs red; a line along the inner orbits as high as the base of antennæ, the pronotum, tegulæ, a spot below the latter, two spots on the scutellum, a transverse band (medially interrupted) on second and third abdominal segments, the base of the fourth segment, the apex of the fifth segment, and subapical bands on ventral segments 2-4, yellow; pubescence on head and thorax greyish, on apical abdominal segments greyish mixed with fuscous, on legs golden; wings flavo-hyaline, nervures and stigma testaceous.

♂. Similar; scape of antennæ below yellow, above black; the yellow bands on second and third abdominal segments interrupted; coxæ, trochanters, and femora more or less marked with black. The yellow band on basal abdominal segment is frequently almost obsolete.

Long. 10-13 millim.

Hab. Kashmir; common between 5000 and 9000 feet.

This is a variable species, and the yellow markings are in many specimens more or less replaced by red.

As the Indian species of *Nomada* do not differ to any great extent in sculpturing and are variable both in size

and colouring, they are very difficult to separate. I have therefore made out the following key to assist in their identification:—

- A. Median segment marked with yellow *N. decorata*, ♀.
 B. Median segment not marked with yellow.
 a. Head and thorax chiefly red.
 a¹. Abdomen with second and following segments black and yellow *N. priscilla*.
 b¹. Abdomen with second and following segments red, or red and yellow.
 a². Length over 10 millim. *N. beata*.
 b². Length under 10 millim.
 a³. Whole abdomen smooth, impunctate.
 a⁴. Enclosed space at base of median segment striate *N. lusca*.
 b⁴. Enclosed space finely rugosely punctured *N. radiata*, ♀.
 b³. Bases of second and following segments punctured *N. adusta*.
 c¹. Abdomen with second and following segments red, with black and yellow markings. *N. flavozonata*, ♀.
 b. Head and thorax chiefly black.
 a¹. Second and following abdominal segments red, with yellow markings.
 a². Head and thorax with red markings *N. radiata*, ♂.
 b². Head and thorax with yellow markings. *N. decorata*, ♂.
 b¹. Second and following abdominal segments black, with yellow, or red and yellow, markings.
 a². Legs more or less yellow.
 a³. Abdomen finely punctured *N. flavozonata*, ♂.
 b³. Abdomen impunctate *N. solitaria*.
 b². Legs red, or red and black.
 a³. Scutellum with two large yellow maculæ *N. arida*.
 b³. Scutellum immaculate.
 a⁴. Front with golden pubescence *N. lucilla*.
 b⁴. Front with long fuscous hairs *N. ceylonica*.

Osmia gulmargensis, sp. n.

♀. Head and thorax very finely and closely, abdomen closely and still more minutely punctured; clypeus rounded anteriorly, large and convex; abdomen scarcely longer than thorax, the segments very slightly constricted at apex. Head, thorax, and legs dark green, shining; flagellum of antennæ black; abdomen lighter metallic green; tibial calcaria and apical joints of tarsi rufous; head, thorax, basal segment of abdomen, and legs as far as the apex of the tibiæ with greyish pubescence, longest on the thorax; remainder of abdomen, the tarsi, and scopa with light red or reddish-golden pubescence, especially thick on the inside of tarsi.

Wings subhyaline, nervures black; tegulæ dark greenish black, shining.

Long. 12 millim.

Hab. Kashmir, near Gulmarg, between 8000 and 9000 feet; a single example.

Osmia kashmirensis, sp. n.

♂. Head, thorax, and abdomen finely and closely punctured, the punctures on the abdomen being shallowest. Metallic green; antennæ black or blackish; apical joints of tarsi more or less rufous; pubescence light reddish grey, longest on the front and thorax, where it more or less hides the sculpturing; tibial calcaria black or blackish. Wings hyaline, nervures and tegulæ black.

Long. 6-7 millim.

Hab. Kashmir; a few specimens obtained between 6000 and 9000 feet.

I obtained this species on one occasion coming out of what was apparently its nest in a hole in the stump of a tree. In general appearance it is not unlike *O. gulmargensis*, but I do not think that it can be the male of that species, as it is only about half its size. The colour of the pubescence is also quite different, and the tibial calcaria in the present species are black or nearly so, whereas those of *O. gulmargensis* are rufous.

Megachile nadia, sp. n.

♀. Closely resembles the same sex of *M. calioxyssides* (Bingh.), but may be distinguished by the lateral hairs of abdominal segments when viewed from above being black, and not white. In some specimens the white pubescence has a somewhat flavous tinge.

♂. Differs from the same sex of *M. calioxyssides* in having the pubescence pale fulvous, becoming almost golden on the clypeus and front.

Long. 7-9 millim.

Hab. Murree-Kashmir road, between 4000 and 5000 feet.

I bred about a dozen specimens from nests made in an old nest of *Eumenes dimidiatipennis*, which I obtained on my way from Kashmir.

Megachile appia, sp. n.

♂. Head, thorax, and abdomen closely and finely, but somewhat shallowly punctured; abdominal segments much

constricted, apical segment notched, but without teeth. Black; tibial claws rufous at base, calcaria testaceous; pubescence greyish, inclining to fulvous on the front and to rufous on the inside of the tarsi; on the head it is long and thick, on the thorax and first abdominal segment it is long and rather sparse, and on the remainder of the abdomen it is short, forming thin, frequently interrupted bands on the margins of the segments; on the posterior tibiæ and tarsi it is short and somewhat sparse. Wings subhyaline, nervures and tegulæ black.

Long. 10 millim.

Hab. Kashmir, 5000–6000 feet.

Nearest to *M. katinka* (Nurse), but it is a larger and more stoutly built insect.

Anthidium conciliatum, sp. n.

♀. Head and thorax closely and somewhat coarsely punctured, granular; abdomen much more finely punctured, the bases of segments more sparsely so than the apices; clypeus transverse anteriorly, with an irregular, median, longitudinal carina; median segment with a median, longitudinal, impressed line at base; scutellum lunate, deeply notched posteriorly; the lateral margins of abdominal segments 5 and 6 produced into teeth; intermediate tibiæ with a short tooth above and a similar but smaller one on anterior tibiæ. Black; a large spot on each side of the clypeus, another on each side of the front below the base of antennæ, a small spot on the vertex behind each eye, and elongate lateral spots on abdominal segments 1–6 yellow; the spots wide apart on first segment, but becoming gradually nearer and broader on each of the other segments successively; all the tibiæ with yellow spots at base, the tarsi tending to testaceous, the anterior tarsi yellowish white above, calcaria testaceous, tarsal claws unidentate, the tooth long and acute; pubescence white, dusky grey on head and thorax above, where it is sparse, on the inside of tibiæ and tarsi it is almost fulvous; scopa white. Wings hyaline at base, subfuscous at apex; nervures and tegulæ blackish.

Long. 10 millim.

Hab. Kashmir; one specimen obtained on the path leading from Baramoola to Gulmarg, between 6000 and 8000 feet.

This species would come into Bingham's key under a new subsection—"b. *U*. *U*². *c*³. Head variegated with yellow, thorax immaculate,"—in which would also come *A. desidiolum* (Bingh.). The latter is, however, easily distinguishable

from the present species by its yellow tibiæ and tarsi. I may mention that the locality given for *A. desidiosum*, described by Lieut.-Col. Bingham from a specimen obtained by me, should be Simla, not Deesa. I obtained a second specimen in 1901 from between 6000 and 8000 feet in Kashmir.

Cælixys stolidus, sp. n.

♂. Head and thorax densely punctured, granular; abdomen finely but not very regularly punctured; clypeus and front in the type specimen with the sculpturing hidden by pubescence; scutellum short, rounded posteriorly, with large lateral teeth; abdomen with all the segments more or less constricted, fourth and fifth segments with minute median longitudinal carinæ at their bases, apical segment with a median groove dividing its apical margin, which is curved upwards; below this, and projecting slightly beyond it, there are two very blunt teeth, the space between them being less than their width; there are also two lateral teeth below, near the base of the segment. Black; clypeus and front with thick pale golden pubescence; cheeks, sides of thorax, two minute spots at the base of the scutellum, the sides of the abdomen, and the legs with snow-white, inside of tarsi with fulvous pubescence; tibial calcaria testaceous. Wings hyaline, slightly infuscated at apex, nervures and tegulæ black.

Long. 10 millim.

Hab. Deesa; a single specimen.

Nearest to *C. cuneatus*, from which it may be distinguished by having no lateral tooth on fifth ventral segment.

Crocisa kashmirensis, sp. n.

♀. Clypeus minutely, head and thorax finely and closely but not very regularly punctured; abdomen finely aciculate; clypeus porrect, its apical margin transverse; scutellum with its apical margin deeply emarginate, its lateral angles produced into two teeth. Black; the pubescence on head and thorax long and greyish, with a few black hairs, thickest on front, where it obscures the sculpturing; abdomen with spots of snow-white pubescence on the lateral margins of segments 1-4, those on the third and fourth segments being less far apart than those on segments 1 and 2; a little black pubescence at apex of abdomen; legs with black pubescence, all the tibiæ having a large spot of snow-white pubescence at base above; tibial calcaria black, the inner calcar of posterior

tibiæ very long. Wings subfuscous; nervures and tegulæ black, the latter large.

Long. 12 millim.

Hab. Kashmir, 5000-6000 feet; fairly common.

Not very near to any Indian species.

Tetralonia brevipennis (Cam.).

I obtained a number of both sexes of this species from Deesa and Abu; and as Mr. Cameron's description was evidently taken from a single specimen, I will add a few remarks to it. The pubescence on the thorax of a fresh specimen is rich fulvous in the female, slightly paler in the male. The shortness of the wings is not always so marked as in the specimen figured by Mr. Cameron. In the male the wings do not appear remarkably short; the antennæ are rufous below, and vary from rufous to black above. The nervures vary from pale to dark testaceous in both sexes.

At Deesa I never found this species except during September; from Abu I obtained it in July and August. As might be expected, the specimens show some seasonal dimorphism, the Abu specimens obtained during the rainy season being much darker than those collected at Deesa during the cold weather.

LXXVI.—Notes from the Gatty Marine Laboratory, St. Andrews.—No. XXIV. By Prof. M'INTOSH, M.D., LL.D., F.R.S., &c.

1. On the Frequency of the Occurrence of Pearls in the Mussel (*Mytilus edulis*), &c.
2. The Effects of Marine Piscatorial Birds on the Food-Fishes.
3. On the British *Eunicidæ*.

1. *On the Frequency of the Occurrence of Pearls in the Mussel (Mytilus edulis), &c.*

The frequency of the occurrence of pearls in the various marine and freshwater shells is fixed by no law. Hundreds of pearl-shells may be examined without finding a single pearl, but, on the other hand, a single Ceylonese shell will occasionally produce a pearl worth a large sum. An experienced pearl-fisherman of the Tay considered that perhaps one in a hundred contained a marketable pearl. In a group of 31 examined lately by Mr. Alex. J. H. Russell, M.A.,